

CLAIMS

1. A cartridge for extracting a beverage from a particulate substance contained therein by means of water under pressure, the cartridge comprising:

5 a main body comprising a cup portion and a lid portion, the cup portion comprising a base, a sidewall and a rim opposed to said base, the lid portion being fixedly attached to said rim of the cup portion so as to define an internal volume of said cartridge,

10 the internal volume of said cartridge housing the particulate substance comprised within filtering means for retaining said particulate substance and for percolating fluid substances therethrough,

15 said lid portion comprising a lid port defining a first passage for percolation fluid substances, the base of said cup portion comprising a cup port defining a second passage for percolation fluid substances,

characterized in that said base comprises a plurality of ridges directly formed thereon and protruding towards the internal volume of the cartridge, so as to support said filtering means and said particulate substance and to define a fine canalization between said filtering means and said cup port.

2. The cartridge according to any one of the preceding claims,
20 characterized in that said cup port protrudes from the base of said cup portion outwardly with respect to said internal volume, so as to convey the extracted beverage into an external cup without contaminating any component of a beverage extraction machine

3. The cartridge according to any one of the preceding claims,
25 characterized in that at least one of said cup port or said lid port comprises fluid flow hurdles formed on its internal surface or mounted therein, for breaking direct fluid flow passing through said cup port or said lid port, respectively.

4. The cartridge according to any one of the preceding claims,
30 characterized in that said lid port protrudes from said lid portion and has a

substantially cylindrical shape.

5. The cartridge according to any one of the preceding claims, characterized in that said lid portion comprises a plurality of ridges directly formed on its inner side and protruding towards the internal volume of the
5 cartridge, so as to support said filtering means and said particulate substance and to define a fine canalization between said filtering means and said lid port.

10 6. The cartridge according to claim 1, characterized in that said lid portion comprises sparse ribs directly formed on its inner side and protruding towards the internal volume of the cartridge, so as to create a small gap
10 between said lid portion and said filtering means.

15 7. The cartridge according to any one of the preceding claims, characterized in that said cup port comprises valve means resiliently openable under pressure of said percolation fluid substances so as to allow
15 passage of said percolation fluid substances through said cup port.

20 8. The cartridge according to claim 7, characterized in that said valve means comprise a pad or disc of a resilient material selected from the group comprising rubbers, elastomers, flexible plastics, said pad comprising a through slit that is normally closed, for insulating the internal volume of said
20 cartridge from external environment and for retaining fluid residuals inside said internal volume when said beverage extraction has been terminated.

9. The cartridge according to claim 8, characterized in that said pad or disc comprises surface ribs for supporting said particulate substance and said filtering means and for allowing fluid passage therebetween.

25 10. The cartridge according to claim 8, characterized in that said valve means comprise a shim mounted on said pad or disc, for supporting said particulate substance and said filtering means and for allowing fluid passage towards said slit.

30 11. The cartridge according to claim 7, characterized in that said valve means, in their opened condition, allow passage of said percolation

fluid substances through at least a narrow orifice, for increasing formation and stability of crema in the beverage extracted from said cartridge when said particulate substance comprises ground coffee.

12. The cartridge according to any one of the preceding claims,
5 characterized in that said lid port comprises a rubber seal having a central pierceable portion and a peripheral thicker portion for providing a radial fluid-tight seal when cartridge is installed into a beverage extraction machine.

13. The cartridge according to any one of the preceding claims,
10 characterized in that the lid port and the cup port are substantially aligned on a water injection axis, said main body being shaped so as to be substantially symmetrical with respect to a plane perpendicular to said water injection axis, so that said cartridge can be installed on a beverage extraction machine regardless of which port will operate as an inlet port for receiving water and
15 regardless of which port will operate as an outlet port for ejecting the extracted beverage.

14. The cartridge according to any one of the preceding claims,
characterized in that said main body has a substantially cylindrical shape and the cup base comprises a flange axially aligned with the sidewall of the
20 cartridge and protruding outwardly with respect to the internal volume of the cartridge, so as to surround said cup port.

15. The cartridge according to any one of the preceding claims,
characterized in that it is made of any material selected from the following:
thermoplastics, aluminum, rubber, polylamine plastics, thermosetting
25 compositions, and any combination thereof.

16. The cartridge according to any one of the preceding claims,
characterized in that said particulate substance is selected from the group comprising: ground coffee, roasted ground coffee, instant coffee, tea,
powdered chocolate, powdered milk, instant based brews, soups.

30 17. The cartridge according to any one of the preceding claims,

characterized in that the lid port or the cup port are of the female type, so as to be able to receive therein a water injection nozzle of a beverage extraction machine during a beverage extraction phase.

18. The cartridge according to any one of the preceding claims,
5 characterized in that said ridges are arc-shaped and arranged along concentric arcs so as to define a plurality of radial and circumferential channels directly on said cup base.

19. The cartridge according to claim 18, characterized in that said channels are substantially 1 mm wide.

10. 20. A cartridge for extracting a beverage from a particulate substance contained therein by means of water under pressure, the cartridge comprising:

15 a main body comprising a cup portion and a lid portion, the cup portion comprising a base, a sidewall and a rim opposed to said base, the lid portion being fixedly attached to said rim of the cup portion so as to define an internal volume of said cartridge,

the internal volume of said cartridge housing the particulate substance comprised within filtering means for retaining said particulate substance and for percolating fluid substances therethrough,

20 said lid portion comprising a lid port defining a first passage for percolation fluid substances, the base of said cup portion comprising a cup port defining a second passage for percolation fluid substances,

25 characterized in that it comprises a disc of porous material arranged between said filtering means and the base of said cup portion, so as to support said filtering means and said particulate substance and to define a fine canalization between said filtering means and said cup port.

21. A cartridge, particularly for espresso coffee machines, for extracting a beverage from a particulate substance contained therein by means of water under pressure, the cartridge comprising:

30 a main body comprising a cup portion and a lid portion, the cup

portion comprising a base, a sidewall and a rim opposed to said base, the lid portion being fixedly attached to said rim of the cup portion so as to define an internal volume of said cartridge,

the internal volume of said cartridge housing the particulate substance comprised within filtering means for retaining said particulate substance and for percolating fluid substances therethrough,

said lid portion comprising a lid port defining a first passage for percolation fluid substances, the base of said cup portion comprising a cup port defining a second passage for percolation fluid substances,

characterized in that said internal volume comprises valve means mounted on said cup port which are resiliently openable under pressure of said percolation fluid substances during a beverage extraction phase, so as to allow passage of said percolation fluid substances through said cup port during said beverage extraction phase.

22. The cartridge of claim 21, characterized in that said valve means are normally closed when no pressure of said percolation fluid substances is applied, so as to insulate the internal volume of said cartridge from external environment when said cartridge is not installed into a beverage extraction machine.

23. The cartridge of claim 21 or 22, characterized in that said valve means are resiliently closable as soon as said pressure of percolation fluid substances drops due to a termination of said beverage extraction phase, so as to retain fluid residuals inside said internal volume.

24. The cartridge according to any one of claims 21-23, characterized in that said valve means comprise a pad or disc of a material selected from the group comprising rubbers, elastomers, flexible plastics, said pad or disc comprising a through slit that is normally closed, for insulating the internal volume of said cartridge from external environment and for retaining fluid residuals inside said internal volume when said beverage extraction has been terminated.

25. The cartridge according to claim 24, characterized in that said pad or disc comprises surface ribs for allowing fluid passage therebetween and for supporting said particulate substance and said filtering means.

26. The cartridge according to claim 24 or 25, characterized in that 5 said valve means comprise a shim mounted on said pad, for supporting said particulate substance and said filtering means and for allowing fluid passage towards said slit.

27. The cartridge according to any one of claims 21-26, characterized in that said valve means, in their opened condition, allow passage of said 10 percolation fluid substances through at least a narrow orifice, for increasing formation and stability of crema in the beverage extracted from said cartridge when said particulate substance comprises ground coffee.

28. The cartridge according to any one of claims 21-27, characterized in that said base comprises a plurality of ridges directly formed thereon and 15 protruding towards the internal volume of the cartridge, so as to support said filtering means and said particulate substance and to define a fine canalization for putting in a fluid communication said filtering means and said particulate substance with said cup port.

29. The cartridge according to claim 28, characterized in that said 20 ridges are arc-shaped and arranged along concentric arcs so as to define a plurality of radial and circumferential channels directly on said cup base.

30. The cartridge according to claim 29, characterized in that said channels are substantially 1 mm wide.

31. A cartridge, particularly for espresso coffee machines, for 25 extracting a beverage from a particulate substance contained therein by means of water under pressure, the cartridge comprising:

a main body comprising a cup portion and a lid portion, the cup portion comprising a base, a sidewall and a rim opposed to said base, the lid portion being fixedly attached to said rim of the cup portion so as to define 30 an internal volume of said cartridge,

the internal volume of said cartridge housing the particulate substance comprised within filtering means for retaining said particulate substance and for percolating fluid substances therethrough,

5 said lid portion comprising a normally closed lid port defining a first passage for percolation fluid substances when it is opened,

characterized in that it comprises a tappet arranged inside said internal volume so as to pierce said base when a pressure is applied to said base towards said internal volume, thus opening a normally closed cup port.

32. The cartridge according to claim 31, characterized in that the base
10 of said cup portion forms a substantially conical hollow volume with said particulate substance and said filtering means, said conical hollow volume housing said tappet that holds on said normally closed cup port.

33. The cartridge according to claim 31 or 32, characterized in that
15 said tappet comprises a disc-like supporting portion on which said particulate substance and said filtering means lean and a spike protruding out from the supporting portion on its side opposite to said particulate substance and said filtering means, so that said tappet holds on said cup port when it is closed and said spike pierces said cup port when said pressure is applied.

34. The cartridge according to claim 33, characterized in that said
20 supporting portion comprises a plurality of through holes evenly distributed on its top surface.

35. The cartridge according to claims 33 or 34, characterized in that
25 the bottom side of said tappet comprises radial ribs protruding towards the base of said cup portion, for keeping a gap between said base and said tappet should said base buckle due to said pressure.

36. The cartridge according to any one of claims 31-35, characterized in that said main body has a substantially cylindrical shape with a conically protruding base.

37. The cartridge according to any one of claims 31-36, characterized
30 in that it is made of any material selected from the following: thermoplastics,

aluminum, rubber, polylaminate plastics, thermosetting compositions, and any combination thereof.

38. The cartridge according to any one of claims 31-37, characterized in that said particulate substance is selected from the group comprising:
5 ground coffee, roasted ground coffee, instant coffee, tea, powdered chocolate, powdered milk, instant based brews or soups.

39. A cartridge for extracting a beverage from a particulate substance contained therein by means of water under pressure, the cartridge comprising:

10 a main body comprising a cup portion and a lid portion, the cup portion comprising a base, a sidewall and a rim opposed to said base, the lid portion being fixedly attached to said rim of the cup portion so as to define an internal volume of said cartridge,

15 the internal volume of said cartridge housing the particulate substance comprised within filtering means for retaining said particulate substance and for percolating fluid substances therethrough,

said lid portion comprising a lid port defining a first passage for percolation fluid substances, the base of said cup portion comprising a cup port defining a second passage for percolation fluid substances,

20 the lid port and the cup port being substantially aligned on a water injection axis,

characterized in that said main body is shaped so as to be substantially symmetrical with respect to a plane perpendicular to said water injection axis, so that the cartridge is usable regardless of which port will 25 operate as an inlet port for receiving water and regardless of which port will operate as an outlet port for ejecting the extracted beverage.

40. An extraction assembly to be mounted on beverage extraction machines, characterized in that it comprises:

a support connectable to a water outlet of a beverage extraction
30 machine; and

a cartridge holder securable to said support for holding a cartridge for extracting a beverage from a particulate substance comprising:

a main body comprising a cup portion and a lid portion, the cup portion comprising a base, a sidewall and a rim opposed to said base, the lid portion being fixedly attached to said rim of the cup portion so as to define an internal volume of said cartridge,

the internal volume of said cartridge housing the particulate substance comprised within filtering means for retaining said particulate substance and for percolating fluid substances therethrough,

10 said lid portion comprising a normally closed lid port defining a first passage for percolation fluid substances when it is opened,

a tappet being arranged inside said internal volume so as to pierce said base when a pressure is applied to said base towards said internal volume, thus opening a normally closed cup port,

15 said cartridge holder being internally shaped so as to apply said pressure to the base of said cartridge towards said internal volume when the cartridge holder is secured to said support.

41. An extraction assembly to be mounted on beverage extraction machines, characterized in that it comprises a support connectable to a water outlet of a beverage extraction machine and a cartridge holder securable to said support for holding a cartridge according to any one of claims 1, 20, 21 and 31.

42. The extraction assembly of claim 41, characterized in that said cartridge holder has an internal shape substantially corresponding to the external shape of said cartridge so that said cartridge can tightly fit within said holder.